

AMENDMENTS TO THE CLAIMS

1. (Previously Presented) An image processing method comprising the steps of:

generating image data from an image;

obtaining one multi-resolution image data in each of a plurality of frequency bands by

converting the image data into multiple resolutions; and

image quantifying a sense of contrast of an image based on the multi-resolution image data, said step of image quantifying comprises

extracting, as a light portion, an area in which the pixel value is equal to or larger than a predetermined threshold value from the multi-resolution image data in a first of said plurality of frequency bands;

generating histograms, corresponding to the light portion, from the multi-resolution image data in frequency bands higher than the first frequency band; and

quantifying the sense of contrast based on said histograms.

Claims 2 – 7. (Canceled)

8. (Previously Presented) An image processing method as claimed in Claim 1, further comprising the step of carrying out image processing on the image data based on the sense of contrast.

9. (Original) An image processing method as claimed in Claim 8, wherein the image processing is at least one of tone conversion processing, frequency enhancing processing, AE processing and chroma conversion processing.

10. (Withdrawn) An image processing method comprising the:

- obtaining luminance data and color data representing luminance information and color information of an image from image data;
- obtaining one multi-resolution luminance image data and/or one multi-resolution color image data in each of a plurality of frequency bands by converting the luminance data and/or the color data into multiple resolutions;
- quantifying the sense of contrast based on a luminance histogram and/or the color histogram in each of the frequency bands; and
- carrying out image processing for changing luminance information of an image represented by image data on the image data based on color information of the image, wherein the carrying out image processing comprises:
 - obtaining color data representing the color information from the image data;
 - obtaining multi-resolution image data in a plurality of frequency bands by converting the color data into multiple resolutions;
 - generating a histogram of multi-resolution image data in a lowermost frequency band out of the multi-resolution image data in the plurality of frequency bands; and
 - carrying out the image processing on the image data based on the histogram.

Claims 11 – 13. (Canceled)

14. (Currently Amended) An image processing apparatus comprising:

generating means for generating image data from an image;

multi-resolution conversion means for obtaining one multi-resolution image data in each of a plurality of frequency bands by converting the image data into multiple resolutions; and

contrast-sense quantification means for quantifying a sense of contrast of an image, based on the multi-resolution image data, said contrast-sense quantification means comprises

extracting means for extracting, as a light portion, an area in which a pixel value is equal to or larger than a predetermined threshold value from the multi-resolution image data in a first of said plurality of frequency bands;

histogram generating means for generating histograms, corresponding to the light portion, for the multi-resolution image data in frequency bands higher than the first frequency band; and

quantification means for quantifying the sense of contrast based on said histograms.

Claims 15 – 20. (Canceled)

21. (Previously Presented) An image processing apparatus as claimed in Claim 14, further comprising processing means for carrying out the image processing on the image data based on the sense of contrast.

22. (Original) An image processing apparatus as claimed in Claim 21, wherein the processing means carries out, as the image processing, at least one of tone conversion processing, frequency enhancing processing, AE processing and chroma conversion processing.

23. (Withdrawn) An image processing apparatus which carries out image processing on image data for changing luminance information of an image represented by the image data, based on color information of the image comprising:

conversion means for obtaining luminance data and color data representing luminance information and color information of an image from image data;

multi-resolution conversion means for obtaining one multi-resolution luminance image data and/or one multi-resolution color image data in each of a plurality of frequency bands by converting the luminance data and/or the color data into multiple resolutions;

histogram generating means for generating a luminance histogram and/or a color histogram, which are histograms of the multi-resolution luminance image data and/or the multi-resolution color image data in each of the frequency bands; and

quantification means for quantifying the sense of contrast based on the luminance histogram and/or the color histogram in each of the frequency bands;

conversion means for obtaining color data representing the color information of the image from the image data;

multi-resolution conversion means for obtaining multi-resolution image data in a plurality of frequency bands by converting the color data into multiple resolutions;

histogram generating means for generating a histogram of multi-resolution image data in a lowermost frequency band out of the multi-resolution image data in the plurality of frequency bands; and

processing means for carrying out the image processing on the image data based on the histogram.

Claims 24 – 26. (Canceled)

27. (Previously Presented) A computer-readable recording medium storing a program to cause a computer to execute an image processing method comprising the steps of:

generating image data from an image;

obtaining one multi-resolution image data in each of a plurality of frequency bands by converting the image data into multiple resolutions; and

image quantifying a sense of contrast of an image based on the multi-resolution image data, said step of image quantifying comprises

extracting, as a light portion, an area in which a pixel value is equal to or larger than a predetermined threshold value from the multi-resolution image data in a first of said

plurality of frequency bands;

generating histograms, corresponding to the light portion, for the multi-resolution image data in frequency bands higher than the first frequency band; and
quantifying the sense of contrast based on said histograms.

Claims 28 – 33. (Canceled)

34. (Previously Presented) A computer-readable recording medium as claimed in Claim 27, further comprising the procedure of carrying out image processing on the image data based on the sense of contrast.

35. (Original) A computer-readable recording medium as claimed in Claim 34, wherein the procedure of carrying out the image processing is the procedure of carrying out at least one of tone conversion processing, frequency enhancing processing, AE processing and chroma conversion processing.

36. (Withdrawn) A computer-readable recording medium storing a program to cause a computer to execute an image processing method for carrying out image processing for changing luminance information of an image represented by image data on the image data, based on color information of the image comprising the steps of:

obtaining luminance data and color data representing luminance information and color information of the image from the image data;

obtaining multi-resolution luminance image data and/or multi-resolution color image data in a plurality of frequency bands by converting the luminance data and/or the color data into multiple resolutions;

generating a luminance histogram and/or a color histogram, which are histograms of the multi-resolution luminance image data and/or the multi-resolution color image data in each of the frequency bands; and

quantifying the sense of contrast based on the luminance histogram and/or the color histogram in each of the frequency bands;

obtaining color data representing the color information from the image data;

obtaining multi-resolution image data in a plurality of frequency bands by converting the color data into multiple resolutions;

generating a histogram of multi-resolution image data in a lowermost frequency band out of the multi-resolution image data in the plurality of frequency bands; and

carrying out the image processing on the image data based on the histogram.

Claims 37 – 39. (Canceled)

40. (Withdrawn) An image processing method as claimed in Claim 10, wherein the step of quantifying comprises the steps of:

setting a pattern for image processing to be carried out on the image data based on the color histogram.

41. (Withdrawn) An image processing apparatus as claimed in Claim 23, wherein the step of quantifying comprises the step of:

pattern setting means for setting a pattern for image processing to be carried out on the image data based on the color histogram.

42. (Withdrawn) A computer-readable recording medium as claimed in Claim 36, wherein the step of quantifying comprises the step of:

setting a pattern for image processing to be carried out on the image data based on the color histogram.

43. (New) An image processing method comprising the steps of:

generating image data from an image;

obtaining multi-resolution image data in the low, medium, and high frequency bands by converting the image data into multiple resolutions;

image quantifying a sense of contrast of the image based on the multi-resolution image data in the the low, medium, and high frequency bands, said step of image quantifying comprising:

extracting, as a light portion, an area in which the pixel value is equal to or larger than a first predetermined threshold value from the multi-resolution image data in the low frequency band;

generating histograms, corresponding to the light portion, from the multi-resolution image data in the medium and high frequency bands;

comparing the distribution width in the histogram of the multi-resolution data at least in the medium frequency band with a second predetermined threshold value; and

judging the image to be a standard image in a case where the distribution width of the histogram of the multi-resolution data in the medium frequency band is larger than the second threshold value, and judging the image to be a low-contrast image in a case where the distribution width of the histogram of the multi-resolution data in the medium frequency band is equal to or smaller than the second threshold value.

44. (New) An image processing method as claimed in Claim 43, said judging step further comprising the steps of:

comparing the distribution width in the histogram of the multi-resolution data in the high frequency band with a third predetermined threshold value in a case where the image is judged to be the standard image, and

judging the image to be a high-contrast image in a case where the distribution width of the histogram of the multi-resolution data in the high frequency band is larger than the third threshold value, and judging the image to be the standard image in a case where the distribution

width of the histogram of the multi-resolution data in the high frequency band is equal to or smaller than the third threshold value.

45. (New) An image processing apparatus comprising:
- generating means for generating image data from an image;
 - multi-resolution conversion means for obtaining multi-resolution image data in the low, medium, and high frequency bands by converting the image data into multiple resolutions;
 - contrast-sense quantification means for quantifying a sense of contrast of the image based on the multi-resolution image data in the the low, medium, and high frequency bands, said contrast-sense quantification means comprising:
 - extracting means for extracting, as a light portion, an area in which the pixel value is equal to or larger than a first predetermined threshold value from the multi-resolution image data in the low frequency band;
 - histogram generating means for generating histograms, corresponding to the light portion, from the multi-resolution image data in the medium and high frequency bands;
 - quantification means for comparing the distribution width in the histogram of the multi-resolution data at least in the medium frequency band with a second predetermined threshold value, judging the image to be a standard image in a case where the distribution width of the histogram of the multi-resolution data in the medium frequency band is larger than the second threshold value, and judging the image to be a low-contrast image in a case where the

distribution width of the histogram of the multi-resolution data in the medium frequency band is equal to or smaller than the second threshold value.

46. (New) An image processing apparatus as claimed in Claim 45, said quantification means further comprising:

means for comparing the distribution width in the histogram of the multi-resolution data in the high frequency band with a third predetermined threshold value in a case where the image is judged to be the standard image, and

means for judging the image to be a high-contrast image in a case where the distribution width of the histogram of the multi-resolution data in the high frequency band is larger than the third threshold value, and for judging the image to be the standard image in a case where the distribution width of the histogram of the multi-resolution data in the high frequency band is equal to or smaller than the third threshold value.

47. (New) A computer-readable recording medium storing a program to cause a computer to execute an image processing method comprising the steps of:

generating image data from an image;

obtaining multi-resolution image data in the low, medium, and high frequency bands by converting the image data into multiple resolutions;

image quantifying a sense of contrast of the image based on the multi-resolution image data in the the low, medium, and high frequency bands, said step of image quantifying comprising:

extracting, as a light portion, an area in which the pixel value is equal to or larger than a first predetermined threshold value from the multi-resolution image data in the low frequency band;

generating histograms, corresponding to the light portion, from the multi-resolution image data in the medium and high frequency bands;

comparing the distribution width in the histogram of the multi-resolution data at least in the medium frequency band with a second predetermined threshold value; and

judging the image to be a standard image in a case where the distribution width of the histogram of the multi-resolution data in the medium frequency band is larger than the second threshold value, and judging the image to be a low-contrast image in a case where the distribution width of the histogram of the multi-resolution data in the medium frequency band is equal to or smaller than the second threshold value.

48. (New) A computer-readable recording medium as claimed in Claim 47, said judging step further comprising the steps of:

comparing the distribution width in the histogram of the multi-resolution data in the high frequency band with a third predetermined threshold value in a case where the image is judged to be the standard image, and

judging the image to be a high-contrast image in a case where the distribution width of the histogram of the multi-resolution data in the high frequency band is larger than the third threshold value, and judging the image to be the standard image in a case where the distribution width of the histogram of the multi-resolution data in the high frequency band is equal to or smaller than the third threshold value.